

APPENDIX B

SYMBOLS AND NOTATIONS

A_s	Area of nonprestressed tension reinforcement (in. ² or mm ²).	F_{px}	The resultant of the diaphragm load acting through the center of mass (kips or K-N).
A'_s	Area of compression reinforcement (in. ² or mm ²).	F_t	The force on an individual vertical resisting element due to a torsional moment M_t (kips or K-N).
A_g	Gross cross-sectional area (in. ² or mm ²).	F_v	Velocity-based site coefficient (at 1.0 sec period).
A_w	Area of the diaphragm web in Equations 5-10 and 5-11 (in. ² or mm ²).	F_{xm}	The portion of the seismic base shear, V_m , induced at level x as determined in paragraph 3-2c.
α	Angle of the diagonal members with the horizontal plane in the special segment of a truss moment frame (degrees or radians).	F_y	Specified yield strength of structural steel (psi or MPa).
a_w	Spacing of marginal welds in steel deck diaphragm in Equation 5-14 (ft or m).	F_{ye}	Expected yield strength of structural steel (psi or MPa).
b_f	Flange width of structural steel beam (in. or mm).	f_a	Axial stress in a structural member (psi or MPa).
b/t	Ratio of flange width to flange thickness for structural steel beams.	f_{ae}	Expected vertical compressive stress (psi or MPa).
C_d	The deflection amplification factor as given in Table 7-2.	f_{me}	Expected compressive strength of masonry as determined in Section 7.3.2.1 (psi or MPa).
C_s	The seismic response coefficient (dimensionless) determined in paragraph 3-2c.	G	Shear modulus (lb/in. ² or MPa).
C_{sm}	The modal seismic response coefficient (dimensionless) determined in paragraph 3-2c.	H	Thickness of soil (ft. or m).
C_{vxm}	The vertical distribution factor in the m^{th} mode.	h_{eff}	Height to resultant of lateral force for wall or pier (in. or mm).
cm	Center of mass.	K	Stiffness of a vertical resisting element in paragraph 5-9b(3)(d) (kips/in. or K-N/mm).
cr	Center of rigidity.	L_I	Distance from adjacent vertical resisting element (i.e. such as a shear wall) and the point at which the deflection is to be determined (ft or m).
d	Distance of a vertical resisting element from the center of rigidity in a torsional analyses (in. or mm).	L	Length of wall (in. or mm).
EI	Flexural elastic stiffness of the chord member of the special segment of a truss moment frame (kips - in. ² or (N-mm ²).	L	single span length of a diaphragm in Equation 5-10 (ft or m).
F	Flexibility factor in paragraph 5-9b(4)(b) (micro in./ft, or mm/m).	L	Span length of truss in a truss moment frame (in. or mm).
F_a	Acceleration-based site coefficient (at 0.3 sec period).	L_p	Limiting laterally unbraced length for full plastic flexural strength, uniform moment case (in. or mm).
		L_s	0.9 times the length of the special segment in a truss moment frame (in. or mm).

l'_w	Effective length of seam weld in steel deck diaphragm (in. or mm).	R	The response modification coefficient as given in Table 7-2.
M_a	The accidental torsional moment in paragraph 5-9b(3)(e) (in.-lb. or N-mm).	R_y	Ratio of the expected yield strength, F_{ye} , to the specified minimum yield strength, F_y . R_y to be taken as 1.5 for ASTM A36 steel rolled shapes and bars and 1.3 for ASTM A572, Grade 42.
M_{nc}	Nonlinear flexural strength of the chord member of the special segment of a truss moment frame (in.-lb. or N-mm).	S	Section modulus based on net cross sectional area of a wall (in. ³ or mm ³).
M_p	Nominal plastic flexural strength of structural steel sections (in.-lb. or N-mm).	S_1	The mapped maximum considered earthquake, 5% damped, spectral response acceleration at a period of 1 second as defined in paragraph 3-1d (g).
M_{RS}	Reduced flexural strength of a link beam in an eccentric braced frame when subjected to axial stress combined with flexure (in.-lb or N-mm).	S_a	The design spectral response acceleration as determined by Equation 3-10, 3-11, or 3-12 (g).
M_s	Flexural strength of the link beam in an eccentric braced frame (in.-lb. or N-mm).	S_{am}	The design response acceleration at period T_m , (sec) (g).
M_t	The torsional moment resulting from the location of the building masses, paragraph 5-9b(3)(d) (in.-lb or N-mm).	S_{D1}	The design, 5% damped, spectral response acceleration at a period of one second as defined in paragraph 3-2b (g).
M_w	Moment earthquake magnitude.	S_{DS}	The design, 5% damped, spectral response acceleration at short periods as defined in paragraph 3-26 (g).
M_u	Required flexural strength due to factored loads (in.-lb. or N-mm) paragraph 5-5b(2)(a).	S_{M1}	The maximum considered earthquake, 5% damped, spectral response acceleration at a period of 1 second adjusted for <i>site class</i> effects as defined in paragraph 3-1d (g).
m	Modification factor used in the acceptance criteria of deformation-controlled components or elements, indicating the available ductility of a component action.	S_{MS}	The maximum considered earthquake, 5% damped, spectral response acceleration at short periods adjusted for <i>site class</i> effects as defined in paragraph 3-1d (g).
N	Average field standard penetration test for the top 100 ft (30m); see Table 3-1.	S_s	The mapped maximum considered earthquake, 5% damped, spectral response acceleration at short periods as defined in paragraph 3-1d (g).
P	Axial force in a member (lbs. or N).	\bar{s}_u	Average undrained shear strength in top 100 ft (30.5); see Table 3-1, ASTM D2166-9 or ASTM D2850-87 (psf or kPa).
PI	Plasticity index, ASTM D4318-93.	T	The fundamental period (sec) of the building as determined in paragraph 3-2c.
P_{nc}	Nominal axial compression strength of the diagonal members of the special segment of a truss moment frame (kips or K-N).	T_0	Period at which the response spectrum shifts from constant response acceleration to constant response velocity as given by Eq. 3-13.
P_{nt}	Nominal axial torsion strength of the diagonal members of the special segment of a truss moment frame (kips or K-N).		
P_{uc}	Required axial strength for a column in compression (psi or MPa).		
q_{avc}	Average shear in diaphragm (lbs./ft or N/m).		

T_m	The modal period of vibration (sec) of the m^{th} mode of the building as determined in paragraph 3-2c.	Δ_d	Diaphragm displacement, in a one-story building with a flexible diaphragm, due to a lateral load equal to the weight of the building (in. or mm).
t	Thickness of the web of a diaphragm in Equation 5-12 and 5-13 (in. or mm).	Δ_w	In-plane wall displacement in a one-story building with a flexible diaphragm, due to a lateral load equal to the weight of the building (in or mm).
t_1	Thickness of flat sheet element in a steel deck diaphragm (in or mm).	Δ_w	Web component of diaphragm deflection (in. or mm).
t_2^1	Effective thickness of fluted element in a steel deck diaphragm (in. or mm).	δ_{xem}	The modal of Level x at the center of the mass at and above Level x determined by an elastic analysis, paragraph 3-2c (in or mm).
t_w	Thickness of wall web (in. or mm).	δ_{xm}, δ_{xm}	The modal deflection of Level x at the center of the mass at and above Level x as determined by Equation 3-21 (in or mm).
V_m	The portion of the base shear contributed by the m^{th} mode (kips or K-N).	ϕ	Resistance factor.
V_{me}	The expected vertical nominal shear strength in a non-special segment of a truss moment frame (kips or K-N).	ϕ_{im}	The displacement amplitude at the i^{th} level of the building for the fixed base condition when vibrating in its m^{th} mode, Paragraph 3-2c.
V_s	Shear strength of the link beam in an eccentric braced frame (kips or K-N).	ϕ_{xm}	The displacement amplitude at the x^{th} level of the structure when vibrating in its m^{th} model
V_s	Shear strength provided by shear reinforcement (lb or N).	ρ_g	Ratio of area of total wall or pier reinforcement to area of gross section.
V_u	Required shear strength (lb or N) due to factored loads in paragraph 5-5b(2)(c).	ΣM_{pb}^*	Moment at the intersection of the beam and column centerlines determined by projecting the beam maximum developed moment from the column face in paragraph 5-5 (c)(7) (in-lb or N-mm).
\bar{v}_s	Average shear wave velocity in top 100 ft (30 m); see Table 3-1 (fps or mps).	ΣM_{pc}^*	Moment at intersection of the beam and column centerline determined by projecting the sum of the nominal column plastic moment strengths, induced by the axial stress, P_{uc}/A_g , from the top and bottom of the beam moment connection in paragraph 5-5(c)(7) (in-lb or N-mm).
W	Uniformly distributed load on a diaphragm in Equation 5-10 (lbs. or N).		
W_m	The effective modal gravity load determined in accordance with Equation 3-15 (kip or kN).		
w	Moisture content (in percent), ASTM D2216-92.		
w	Unit weight of concrete in Equation 5-13 (lbs/cu ft or N/m ³).		
w_i, w_x	The portion of the total gravity load, W , located or assigned to Level i or x (kip or kN).		
Z	Plastic section modules of a member (in ³ or mm ³).		
α	A form factor in Equation 5-10 and 5-12.		
Δ	The design story drift as determined in Section 5.3.8.1 of NEHRP 97 (in. or mm).		